

3. A semiconductor photodetection device as claimed in claim 1, wherein said first semiconductor layer has a thickness of 50 nm or more.

5

4. A semiconductor device as claimed in claim 1, wherein the second thickness of said second semiconductor layer is smaller than a sum of the first and second thicknesses by a factor of $(0.9 \times L^{1/4} \times \epsilon)$ in terms of microns, wherein ϵ represents the strain accumulated in said first semiconductor layer and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer.

10
15
20

5. A semiconductor photodetection device as claimed in claim 3, wherein the second thickness of the second semiconductor layer is smaller than one-half the first thickness of the first semiconductor layer.

25
30

6. A semiconductor device as claimed in claim 5, wherein the second thickness of said second semiconductor layer is smaller than a sum of the first and second thicknesses by a factor of $(0.9 \times L^{1/4} \times \epsilon)$ in terms of microns, wherein ϵ represents the strain accumulated in said first semiconductor layer and L represents a sum of a total thickness of said

35

first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer.

5

7. A semiconductor photodetection device as claimed in claim 1, wherein each of said first and second semiconductor layers comprises a ternary compound semiconductor material.

15

8. A semiconductor device as claimed in claim 7, wherein the second thickness of said second semiconductor layer is smaller than a sum of the first and second thicknesses by a factor of $(0.9 \times L^{1/4} \times \epsilon)$ in terms of microns, wherein ϵ represents the strain accumulated in said first semiconductor layer and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer.

30

9. A semiconductor photodetection device as claimed in claim 1, wherein said substrate comprises n-type InP and said first and second semiconductor layers comprise n-type InGaAs.

35

10. A semiconductor device as claimed in claim 9, wherein the second thickness of said second semiconductor layer is smaller than a sum of the first and second thicknesses by a factor of $(0.9 \times L^{1/4} \times \epsilon)$ in terms of microns, wherein ϵ represents the strain accumulated in said first semiconductor layer and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer.

11. A semiconductor photodetection device as claimed in claim 1, further comprising an intermediate layer between said first and second semiconductor layers, said intermediate layer having an intermediate bandgap between a bandgap of said first semiconductor layer and a bandgap of said second semiconductor layer.

12. A semiconductor device as claimed in claim 11, wherein the second thickness of said second semiconductor layer is smaller than a sum of the first and second thicknesses by a factor of $(0.9 \times L^{1/4} \times \epsilon)$ in terms of microns, wherein ϵ represents the strain accumulated in said first semiconductor layer and L represents a sum of a total thickness of said first semiconductor layers in said photodetection layer and a total thickness of said second semiconductor layers in said photodetection layer.

13. A semiconductor photodetection device as
claimed in claim 11, wherein said intermediate layer
is provided at a side of said first semiconductor
layer closer to said region of said second
5 conductivity type.

10 14. A semiconductor photodetection device as
claimed in claim 11, wherein said intermediate layer
has a composition profile that changes gradually in a
thickness direction thereof.

15

15. A semiconductor photodetection device as
claimed in claim 14, wherein said intermediate layer
20 accumulates a tensile strain at a side thereof
contacting said second semiconductor layer and a
compressive strain at a side thereof contacting said
first semiconductor layer.

25

16. A fabrication process of a semiconductor
photodetection device, comprising the steps of:
30 forming a photodetection layer on a
semiconductor substrate by alternately and repeatedly
forming a first semiconductor layer and a second
semiconductor layer on said semiconductor substrate
while changing a flow-rate of source gases without
35 interrupting a supply thereof; and
forming an electrode on said photodetection
layer so as to apply an electric field in a thickness

direction of said photodetection layer,

5 said first semiconductor layer being formed
of a ternary compound semiconductor material having a
lattice constant different from a lattice constant of
said substrate and accumulating therein a compressive
strain, said second semiconductor layer being formed
of a ternary compound semiconductor material having a
lattice constant different from said lattice constant
of said substrate and accumulating therein a tensile
10 strain.

15 17. A method as claimed in claim 16, wherein
said steps of forming said first semiconductor layer
and said second semiconductor layer being conducted
alternately by an MOVPE process while changing a flow-
rate of metal organic sources continuously.

20